UNITED STATES DEPARTMENT OF AGRICULTURE

Radio Service

OFFICE OF INFORMATION

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CHATS WITH THE WEATHER MAN

RELEASE Friday, January 6, 1933

FOR BROADCAST USE ONLY

Reading Time: 10 Minutes.

ANNOUNCEMENT: And now for our Chat with the Weather Man. Today the Weather Man recalls a few interesting tales about how Uncle Sam's weather men help the courts solve baffling murder cases, and damage suits.

---oOoo---

I remember reading a story in one of my first history books about how Lincoln used an almanac in court to save a man from the gallows.

Perhaps you know the details of that story better than I.

But, as I recall, a certain man was on trial for murder. One of the witnesses testified he saw the accused man commit the murder by the light of the moon. Things looked bad for the defendant. But, the young lawyer---Lincoln---had an idea. The witness had testified he saw the details of the murder in the moonlight. But was the moon shining at the time of the murder? Lincoln consulted an almanac. It was not. The accused man went free.

That may sound like a rather unusual case. But it isn't. Dr. C.C. Clark, of the United States Weather Bureau, tells me astronomic and weather records figure in thousands of court cases every year.

However, the procedure in such cases has changed a great deal since Lincoln's day.

Lincoln, himself, presented the record of the moon's rising.

Today, a lawyer in a similar case would more than likely call on one of Uncle Sam's trained weather men to present such testimony. He would call the weather man into court as an "expert witness."

Lincoln went to court armed with an almanac.

The present-day weather witness would likely find the almanac quite inadequate. To be sure, he might look in his almanac and find that the sun, or moon, rose, or went down at such and such a time on a particular day. But when a lawyer asked him, "How much rain ---if any---fell on December 16, 1928?" or "What was the temperature at midnight on January 23, 1925?" or "Was there any fog on March 4, 1931?" I'm afraid the almanac would be found wanting. At least, I'm sure no judge would admit the almanac's word as evidence.

Lincoln had a rather clear-cut question: What time did the moon rise on such and such a night?

But, the Twentieth-Century weather witness runs into question after question that would stump a Philadelphia lawyer. At least, the questions would stump a Philadelphia lawyer of Lincoln's day.

For instance, Dr. Clark told me of a suit brought by a furniture company against one of the big railroads.

The furniture company shipped a car of furniture from North Carolina to the Northwest. When the car arrived at its destination, the furniture was dripping with water; the veneer and finish of the furniture were completely ruined. The furniture company sued the railroad to recover damages.

"You ruined our furniture through negligence," the furniture company charged.

"We were not responsible," the railroad replied. "The damage occurred through an 'act of God'--- through conditions beyond our control."

How would you settle a dispute of that kind?

Well, the Philadelphia lawyer might scratch his head quite a while over that question. But not the trained weather man. The weather man who testified in that case looked up the route that carload of furniture took in going from North Carolina to the Northwest. Then, he got out his weather records to get the relative humidity---in other words, to see how "damp" the air was---at various points along the route. His records showed the furniture passed through regions where the air was very damp.

The court examined those records and then said to the railroad: "You could and <u>should</u> ---have known about that weather condition and should have prevented damage to the furniture by proper ventilation of the car. So, we hold that you must pay the furniture company damages."

Clark told me about another case that wound up in much the same way.

The sewerage department in one of our larger cities threw up a bank of dirt across a road while putting in a sewer system. A big rain came along. The bank of dirt caught the water running down the street and backed the water up into a nearby house. The owner of the house charged the water damaged the foundation. He sued the city for damages.

In his suit, the home owner accused the city of negligence. He held the sewerage department should have put in a culvert to carry off water above the bank of dirt.

The city countered with the old, popular "act of God" plea for "limitation of damages." The city said, "Such rains as the one that damaged this man's house are very unusual. We could not foresee a big rain of that kind and so did not take steps to handle the large amount of water that collected behind the bank. Consequently, we should not be held responsible for damages."

But the home owner wasn't satisfied with the city's excuse about the unusual size of the rain. He asked the Weather Bureau to produce records of rainfall for that city.

The representative of the Weather Bureau took his rainfall records to court.

The lawyer asked the weather man, "Are rains like the one that damaged this man's house a common thing around here?"

"Yes."

"How often do they occur?"

"About a dozen times a year."

That testimony ruined the city's "act of God" plea.

That same weather man threw a bombshell into another damage suit.

A woman claimed she slipped on the ice at the front of a certain store and injured herself. She sued the storekeeper for damages.

But that woman overlooked one little point. When the weather man produced his records in court, he showed the weather on the day of the woman's accident was warm---much too warm for ice to lie around on the sidewalk. So, naturally, the weather man's testimony ruined the woman's plea.

Well, Clark told me of case after case where the court called upon the Weather Bureau to furnish weather records of this and that kind. He had records on something around 50,000 different cases. They included about every kind of question about the weather you could imagine.

For instance, a party to a suit at Bismarck, North Dakota, asked for the date of the first killing frost in 1911---and a record of the frost warnings issued---and to whom the warnings were issued.

At Birmingham, Alabama, the court asked for facts about a wind that blew over a big wall and wrecked a store. If the man who owned the wall could prove the wall went over in an unusually high wind he could lay the wrecking of the store to an "act of God," and so escape paying damages.

A man at Des Moines, Iowa, asked for information about the weather---- especially the amount of snow and sleet on the ground---on February 1 to 10, 1916.

Other persons asked for records about cloudiness, and fog, and the temperature, and wind direction, and wind violence, and time of sunset, and the time the moon rose on certain dates.

I asked Clark if the weather men have much trouble answering those questions.

"Usually not," he said.

"We have a vast army keeping tab on weather conditions throughout the country 24 hours a day. First, we have our 250 regular Weather Bureau stations in the various towns and cities throughout the country and at the big airports. Then, reporting to those stations, we have 5,000 local observers covering every county in the United States. Those 250 stations make up daily reports on the rainfall, and snow, and wind direction and velocity, and temperature, and many other facts about the weather. They send copies of their records to the Weather Bureau at Washington. From those records, we can tell the story of weather conditions at any time for almost any part of the country."

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ANNOUNCEMENT: And that is the story of how the United States Weather Bureau supplies its vast store of weather records for use in court. You will hear another talk about the weather men and their work at this same time two weeks from today.

UNITED STATES DEPARTMENT OF AGRICULTURE

Radio Service

CHATS WITH THE WEATHER MAN Friday, January 20, 1933

(For Broadcast Use Only)

Reading Time: 10 Minutes

ANNOUNCEMENT: And here's our old friend the Weather Man. He comes to you every two weeks at this time with interesting facts about the weather. Today he tells you how ships on the ocean, and airplanes in the air, and trains on the land, and the wheels of industry start and stop at the words of the weather forecaster.

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I imagine nearly every one of you looked at your paper or listened to the radio today to get the weather forecast.

Some of you may follow the weather reports out of curiosity---others out of mere habit. But I expect a far greater number of you get the weather forecast for some particular reason.

Perhaps you want to know whether to take an umbrella or wear overshoes.

Or, you may be planning an automobile trip. You want to know what kind of weather you will have.

Again, you may have a furnace in your house. You watch the weather forecasts for reports of a cold snap. If a cold snap is headed your way, you may want to get more coal or oil.

You doubtless follow the weather forecasts for frost warnings so you can cover up your flowers, and shrubs, and plants before a freeze.

I might go on and on citing ways you use the daily weather forecasts.

But I still have not touched on one of the main uses of the forecasting service. I have said nothing about how the weather forecasters serve industry and business.

Bankers consult the weather forecasts before making certain types of loans. Railroads and trucking companies rely on weather forecasts in scheduling shipments of perishable fruits and vegetables and livestock. Air lines depend on weather forecasts in dispatching their planes. Fruit growers use the weather forecasts in managing their orchards.

I got a pretty good idea of just how the weather forecasts help those and other kinds of business and industry from E. H. Bowie who heads the Weather Bureau office at San Francisco.

Bowie told first of the forecasting work on the Great Lakes.

I gathered that the shipping business on the Great Lakes is, in a sense, really the father of the present forecasting service.

The Great Lakes are the scene of frequent and violent storms. Those storms used to take a heavy toll of life and shipping. They swooped down on the Lake boats without warning and sent the boats and their crews and cargoes to the bottom before they could make port. The shippers naturally wanted to find some way to prevent those losses---some way to warn their boat captains of approaching storms. So, the shippers asked Congress to set up some kind of weather forecasting system. Congress passed a bill in 1869 to set up a weather service in the Army Signal Corps. Congress later put the weather service under the Department of Agriculture.

The captain who puts out into the Great Lakes today sails with a knowledge of the kind of weather he is likely to meet. Flags flying at the Lake ports warn him of storms before he sails. Wireless and radio reports warn him of storms that brew after he gets out upon the Lakes. The vast network of weather stations keeps him in close touch with weather conditions over the entire Great Lake region.

But, of course, the Weather Bureau's service to shipping isn't confined just to the Great Lakes. The forecasters also wireless their warnings of storms and reports on weather conditions to ships on the Atlantic and Pacific, and on southern waters. When the ship captain hears of a storm bearing down upon him, or of a bad sea, he may delay sailing, or change his course, to protect his passengers and crew, and his cargo.

From your knowledge of the sea, and from the many stories you've heard and read, you can readily see how important the weather forecast is to the ship on the ocean.

You also can see the importance of weather forecasts to aviation.

Pilots roaring their way through the clouds must know what kind of weather lies ahead. Will they run into a thunder storm or a high wind. Or will they strike sleet or snow? If they hear of bad flying along their route, the pilots---especially pilots on the passenger lines---head for a landing field. ---Or, if they are already on the ground, they delay their take-off. They can't afford to risk the lives of their passengers.

The pilots have the benefit of the general forecasts such as you read in your paper and hear over the radio. But pilots on the established airways now also get special aviation forecasts.

A great many airports on the established airways have Weather Bureau stations. The forecasters at the airport stations take the general 12-hour forecasts from the central forecasters and, with frequent reports from stations on and near the airways, make 4-hour short-range forecasts; that is, forecasts for a short stretch of country along the airways. Dispatchers at the airports use those short-range forecasts in directing the movements of the 'planes and pilots consult them before departing.

But, in addition to their services to shipping and aviation, I wonder if you realize what an important part the forecasters play in directing one other big kind of transportation. I refer to the railroads.

Of course, a train speeding along its solid bed of wood, stone, and steel isn't bothered much by the ordinary wind or rain. Only an occasional

big snow or flood is likely to give it much trouble. But the railroads are interested year in and year out in forecasts on temperature and the amount of moisture in the air. They need that information to protect their millions and millions of dollars worth of freight from freezing and from heat and moisture damage.

For instance, the railroads use weather forecasts in scheduling shipments of hogs and other livestock.

You may think of hogs as tough, hardy creatures that can stand almost any thing. But they're not. They are especially susceptible to heat. If you ship a car of hogs during a hot, scorching spell of July or August, you may open up the car at the end of its journey to find half of the hogs dead. So, naturally, the railroads hold up shipments of hogs if they get warning of a severe heat wave.

The railroads are equally interested in warnings of freezes. If they get a forecast of a cold snap, they may run cars of fruit, and other perishables into roundhouses until the weather warms up again. And, if they get a warning of a long period of cold weather, they may refuse to take shipments of certain perishable products.

Well, we've talked about weather forecasting for the seas, and lakes, and airways, and railroads. But we've said nothing about rivers.

The weather men also keep an eye on the rivers---they have what they call a "River and Flood Service." River and flood reports are highly useful to the great fleet of steamboats and other boats that chug up and down our river with their barges of oil, and lumber, and other products. The captains of those boats must know how deep the water is, and how much current they will find, from point to point along the river.

But, perhaps an even more important job of the River and Flood Service is to warn folks along the river bottoms about floods and spring freshets. Folks in the valleys must have time to save their property and livestock from the swirling flood waters, and, also, to save themselves.

A little advance information about the rains often saves property and money in still other ways.

For instance, Bowie told how the weather forecaster saved a considerable sum of money a few years ago to the city of San Francisco.

San Francisco was threatened with a water famine. The Chamber of Commerce met with the city engineers to consider emergency measures they might use to bring water to the city if rains didn't replenish the reservoirs. But, of course the city didn't want to spend a lot of money to get water if they saw any prospects of rain in the near future.

When would the winter rains begin? That was the big question.

The Chamber of Commerce and engineers sought an answer to their question from the office of the Weather Bureau. The weather men studied their weather maps. They saw a condition developing over the northeast Pacific that promised rain. The rain would hit California within 48 hours. They advised the city to wait at least 10 days before it undertook any emergency measures.

Well, the rains came in the predicted time and the city saved its money.

Bowie related another story of how the treasurer of a company in St. Louis used the weather forecasts to plan his sales program. The company had business in nearly every state in the Union. This enterprising business man knew weather conditions in the various states would influence crops. The condition of crops, in turn, influenced the buying power of folks in those states. So, he visited the Weather Bureau office at least once a week to get the seasonal trends of the weather. He used the weather reports and forecasts in deciding how much goods of this and that kind to put in stores in the various states, and also in deciding how much credit he would extend in various sections.

Those are just a few of the ways business and industry use the weather reports you hear and read from day to day. I will tell you of other uses for weather information in later talks.

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ANNOUNCEMENT: And so we conclude today's Chat With the Weather Man. The Weather Man will bring you another story from the United States Weather Bureau at this same time two weeks from today.

UNITED STATES DEPARTMENT OF AGRICULTURE

Radio Service

OFFICE OF INFORMATION

CHATS WITH THE WEATHER MAN

RELEASE Friday, February 3, 1933

FOR BROADCAST USE ONLY

Reading Time: 10 Minutes.

ANNOUNCEMENT: Our Weather Man is back today with another of his chats about the weather. Some of you older folks---and younger folks, too, for that matter---will be interested in his story about our changing climate. Are the winters getting colder---or warmer? ---Or, are they changing at all? Well, we'll see what the Weather Man thinks---

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I hustled across the streets and parks of Washington a week ago last Monday to see my friends in the United States Weather Bureau.

Monday before last was January 23, you remember.

January 23 should smack a bit of winter---even in Washington. Of course, you may not find snow at that time. Washington's snows are usually rather few and far between. Neither will you necessarily find especially cold weather on that date. For our capital city's climate is really very mild. Nevertheless, you usually find enough snap in the air on the 23d of January to let you know winter is still officially with us.

But, as I hurried along toward the Weather Bureau, Old Man Winter seemed to have packed up his snow and frost machinery and beat a full retreat toward the North Pole.

The air was as warm as the first day of May.

I noticed two or three small children rolling around on the grass.

Maids and housewives wheeled baby carriages through the parks or stood in small groups exchanging bits of news.

The postman trudged along the walk with his blue coat over his arm.

"Well," I thought to myself, "this is rather odd---all of this spring weather right here in the middle of January. ---Especially odd coming on top of all the rest of the warm, mild weather we've been having lately. I'll see what the weather men have to say about it." So, I scooted up the steps to the division in the Weather Bureau that keeps tab on this mysterious climate of ours.

I found J. B. Kincer, the chief, looking over a long list of figures.

I said, "Good morning, Mr. Kincer. Fine spring weather we're having."

Kincer replied, "Spring weather indeed. In fact, I see from our records here that the temperature during the past 24 hours has averaged 60 degrees---or the average normal weather for the first week in May."

I remarked, "Almost like Florida weather."

Kincer ran his finger down the long list of figures. He replied, "Florida weather is right. The normal average temperature for Jacksonville at this time of year is 56 degrees, while the temperature for Miami is 66 degrees. So, Washington with its temperature of 60 degrees for the past 24 hours lies somewhere between Jacksonville and Miami, climatically speaking."

"What about other northern cities? What kind of weather are they having?"

"Much the same kind. The weather throughout the northern and central parts of the country has been much warmer than the normal temperature for the past five weeks. Five consecutive weeks of warm weather is an unusual record for winter conditions."

"Last winter was also much warmer than usual, wasn't it?"

"Yes, the winter of '31-'32 over much of the country was the warmest on record."

Well, I thought I at last was on the track of a big story. Kincer had just told me last winter was the warmest winter on record. This winter also seemed about to turn out mild. The old folks may be right after all. Perhaps we don't have the winters they had when Grandfather was a boy. Maybe our climate is actually changing.

I expressed some such possibility to Kincer.

Kincer smiled. "Well sir," he said, "I'll grant you our winters over the past several years have been rather mild. But that doesn't mean that they will keep getting milder and milder indefinitely---or that the entire United States will some day be warm and sunshiny the year around. The present period of warm winters is probably just part of a series of cycles---cycles in which we have a bunch of warm years, then some few moderate years, followed by cold years. For, you see, centuries have their cycles, or seasons, just like individual years. We may have a few years somewhat colder than normal; they make up the winter of the century. Next, come some rather moderate years; they are the spring. Next, a few warm years like we're having now; they are the summer. Then, a few moderate, or fall, years. And, finally, cold, or winter years again.

"Of course, I don't mean every year in the warm part, or summer, of the century will necessarily be warm. You may have a cold year sandwiched in between some warmer years just like you have cool days in July or August. But if you follow the average temperatures over periods of 20 years, you find them rising and falling, rising and falling, just like you do from winter to summer, and summer to winter.

"For instance, just look at this chart."

Kincer unrolled a big chart showing the trend in weather conditions, or climate at St. Paul, St. Louis, Washington, and Albany over the past 113 years---or, since about 1820. The changes in climate at all four cities seemed to have followed about the same course.

He said, "You'll notice that from about 1820 to 1840, the years were gradually getting colder. In other words, we were passing through the last August or early

September of the century. By 1840, the average temperature over a period of 20 years had fallen below normal. The average kept dropping for about 20 years and hit the lowest point along during the '60's. Many folks will remember those extremely cold winters we had along about the close of the Civil War. You might call the years from 1865 to '70 the winter, or December and January, of the century. After about 1870, the years began to get warm again. By about 1900, the average temperature was back above normal. We were passing from spring to summer. The average temperature ever since has been rising and rising.

"Of course, bear in mind I'm talking about average temperatures---averages over a period of 20 years. During those 20 years you will find some colder years just as you sometimes may have a cool Fourth of July. For example, I expect a great many folks will recall that bitter cold winter of 1917-18. But the average temperature "snapped right out of it" after that cold year and began to climb again. We are still in the summer of the century."

I immediately asked how long this present summer is going to last. How long before we will start having cold winters again---the kind they had when Grandfather was a boy?

Well, Kincer wouldn't risk an answer to that question.

He said, "I'm not at all sure that a chart of weather cycles in the past is a reliable guide of what will happen in the future. But, even if it were, this chart of mine doesn't cover a long enough time to be of any use. You see, my chart starts at the end of the summer that closed along about 1820. It goes through the winter years of the '60's and '70's and on up to the summer years of the present time. When the present summer will end, I don't know. So, I probably haven't charted out even as much as one year of the century's seasons as yet. "Until I pass the 'one-year' mark, so to speak, I won't know just how long these summers of the centuries last and when the years will begin to get colder again."

Well, that brought another question to my mind. When we pass through this present cycle of warm years, just what will happen? Will the winters, alone, get colder? Or, will the springs, and summers, and falls also show a drop in average temperature?

Kincer again turned to his charts.

"You'll notice from those charts that winter is the most irregular and changeable of all the seasons. During the past 100 years we've had three seasons, or cycles, of cool winters. We had several cool winters during the latter part of the '30's. Then came that series of extremely cold winters along about the close of the Civil War. After the Civil War, our winters began to get warmer. They hit a third rather cool spell along from 1900 to 1910. And then they began to get warmer again.

"The other seasons have had their ups and downs just the same as winter. However, they haven't followed quite the same course.

"Fall, in particular, has changed more or less independently of the other seasons. We had our longest and most intense period of cool falls about a hundred years ago---along during the late '30's. After that the falls began to get warmer.

They cooled off a little during that spell of cold winters in the '60's. But, generally speaking, the fall season has been gradually getting warmer over the past 100 years."

Well, I still had one important question. What's the reason for those changes in the seasons over the years?

Kincer doesn't know. Folks have offered many theories. Some say the earth may tilt a little on its axis. But we have no evidence that the position of the axis has changed. Others say dust from volcanic eruptions may shut the earth off from the sun from time to time. But that doesn't account for the 40 or 50 year swings in temperature.

So we must simply say: Our warm years come in bunches, and our cold years come in bunches. But as yet we don't know why.

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ANNOUNCEMENT: And that concludes another of our Chats With the Weather Man, brought to you through the cooperation of the United States Weather Bureau. We will have another Chat for you at this same time two weeks from today.

UNITED STATES DEPARTMENT OF AGRICULTURE

Radio Service

OFFICE OF INFORMATION

CHATS WITH THE WEATHER MAN

Friday, Feb. 17, 1933.

NOT FOR PUBLICATION

Speaking Time: 10 Minutes.

ANNOUNCEMENT: And now for our chat with the Weather Man. The Weather Man has been to the United States Weather Bureau again. He is going to tell us what the weather-wise men say about long-range forecasting and the like ------

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Every few days, Mr. Tannehill tells me, the United States Weather Bureau gets requests for long range forecasts. Folks write in, in all seriousness, to ask what the weather will be a month from now, or next summer, or next year.

Mr. I. R. Tannehill, you know, is in the forecast division of the Weather Bureau, to which these queer questions come.

Of course, those of you who know the weather and how the Weather Bureau works know the answer to those questions.

True, there are goose-bone prophets and wish-bone prophets who, now and again, claim they can predict the vagaries of the weather far in advance. And, strange as it may seem, a lot of good folks believe them.

It does seem funny, however, that of all the trained weather men in all the Weather Bureau stations throughout the country and all the weather specialists at the Weather Bureau headquarters, you never hear one making these long range weather forecasts. And you can just about bank on it, that if we ever do find out any practical way to really forecase the weather a long time ahead, our Weather Bureau will be doing it.

Our present system of daily and weekly forecasts is based on the idea of knowing just what the weather is all over the country. Knowing what the weather is here and a long way from us, which way it is headed, and what conditions are along the route, enables the forecaster to estimate what it will be here tomorrow, and the next day, and even, what the weather will be next week. Although, of course, the week ahead forecasts can't be made with as much detailed accuracy as those for 36 to 48 hours ahead.

You see, weather forecasting is something like Paul Revere's ride. Instead of being "booted and spurred, and ready to ride" like Paul Revere, however, our weather forecasters are armed with telegraph and radio to give warning of what's coming.

But that doesn't mean that our weather scientists are indifferent to this problem of extending the range of forecasts. They are continually looking for the laws back of present conditions which control weather, and studying the possibilities of other things influencing our weather beside the temperature, and wind, and pressure ordinarily considered in making forecasts.

There are what you might call wish-bone prophecies. We get that kind every once in a while. Mr. Tannehill says honest, sincere seekers after this will-o-the-wisp of forecasting often let their enthusiasm for some pet idea run away with them. They hit upon some contributory cause of weather conditions, and try to base forecasts on it as the chief or only cause.

This variety of complex conditions constantly changing and interacting with each other, which we call the weather, may be due to a thousand factors.

In fact, Mr. Tannehill tells me, we have maps of weather conditions in this country for each and every day in the year for the past forty years and more, yet no two of those maps are exactly alike. Often, he says, he has seen a map of the weather which reminded him so strikingly of some other map, that he has looked it up only to find differences here, there, and yonder. The chances of getting two precisely alike is next to nothing.

In limited localities, scientists have at times detected apparent correlations, for instance, between the temperature of sea water and weather on shore. Rainfall in certain parts of California and in India has been correlated with sea temperature or other conditions in an imperfect way. But when it comes to making a forecast for the entire country, Mr. Tannehill points out that no reputable meteorologist claims to have discovered any system by which reliable forecasts can be made further ahead than those made daily and weekly by the Weather Bureau.

The United States Weather Bureau, as well as various other scientific institutions, is making a study of the variations in radiation from the sun, in an effort to find what effect if any those variations have upon the variations in our weather. Such correlations, however, are still open to question, and nothing has been worked out which can be relied upon in practical weather work throughout the country.

In the meantime, while the country's chief weather scientists are groping into these fundamental weather problems, Mr. Tannehill tells me our annual crop of goose-bone prophets come out from time to time with sensational claims to predict the weather for the entire country for months and even years in advance.

Most such predictions are mere guesses. Then, too, people in all parts of the country still rely on the weather advice contained in almanacs, which some of the prognosticators claim they get from the position of the planets. Of course, our real weather experts deny that the planets have any influence on the weather that they have been able to detect. They deny most emphatically that anyone can say what this old weather of ours will do a year in advance, by any system that will stand up against logic and scientific reasoning.

Mr. Tannehill points out, however, that any guess on the weather made with an intelligent knowledge of the conditions that normally occur during a season in a particular region, will be right occasionally. If the guesser is lucky, he may be right half the time. But that is not science, nor is it weather forecasting in any fair sense of the words - it is guessing.

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ANNOUNCEMENT: You have just heard the chat with the Weather Man. This Station presents this feature once every two weeks in cooperation with the United States Department of Agriculture.

UNITED STATES DEPARTMENT OF AGRICULTURE
Radio Service
OFFICE OF INFORMATION

CHATS WITH THE WEATHER MAN Friday, March 3, 1933.

(FOR BROADCAST USE ONLY)

Reading Time: 10 Minutes.

ANNOUNCEMENT: And now the Weather Man with another story for you from the United States Weather Bureau. Today, the Weather Man chats with you about frost -- not the white, glistening crystals you see on the grass and leaves, but the frost in the ground that gives so much worry to engineers and builders.

----ooOoo----

Those of you who have ever done any kind of building or construction work know the importance of having information about the depth of the frost line.

Even if you were only building a house, or putting in a small sewer or water line, you naturally tried to find out how deep the ground is apt to freeze below the surface. You wanted that information to help you decide how deep to lay the pipe for your water or how deep to run the foundation.

If those facts were important to you in your small job, they are immensely more important to the man handling a job costing thousands or millions of dollars.

For instance, take the engineer putting in a water system for a big city.

During unusually cold winters, some cities have found themselves with frozen or bursted water mains. The cities have been without water for several hours -- or even several days because some engineer made a mistake in estimating the depth of the frost line for that particular city. An engineer designing a water system for a big city is going to try to get accurate facts on the depth of frost penetration to help him avoid similar errors.

Or, take the contractor putting up a big office building.

Suppose the contractor fails to run the foundation of the building below the frost line. As the ground below the foundation freezes and thaws, it may let the foundation sink and crack the walls and floors of the building.

The depth of the frost line is also important in road building.

Road builders putting down a new concrete road in one of the colder sections of the country don't try to go below the frost line. That would be too expensive. But they do take the depth of frost penetration into account in deciding how thick to make the road.

When the contractor or engineer wants information about the frost line in a particular community, he usually can find somebody who has a pretty good idea as to just how deep the frost goes. In some communities, he may be able to get hold of accurate records on frost penetration over a period of several years. But a man's memory about the freezes in his community -- especially over a long stretch of time -- may be rather hazy. Besides, the contractor who wants to know about the frost penetration in some neighboring, or some distant state, may not care to make a special trip to that state to get his information. He wants some convenient record he can turn to.

Many builders and engineers turned for such information to the United States Weather Bureau. So, the weather men set about to get a nation-wide chart, or map, of frost penetration.

In most cases, the weather men and their more than 5,000 cooperative weather observers didn't have the frost information themselves. They got their facts from engineers, and water works officials, and -- maybe you wouldn't think it -- also from grave diggers. Yes sir, those men who pick away at the same ground year after year, winter after winter, digging graves were about the most reliable source of information the weather man found. The diggers always had a pretty good idea where the frozen earth stopped and the soft earth began.

But, of course, the weather men had to keep their eyes peeled to prevent mistakes creeping into their charts.

For example, J. B. Kincer, chief of the division of climate and crop weather, told me of one frost depth report that showed an average frost penetration of 12 feet, while the average of other records from that region was only two feet. When the weather men checked up, they found the reason for the difference. The man who sent in the record of 12 feet got his measurements in some loose filled-in ground along a highway. Since the fill was loose, the cold soaked down into the ground like water into a sponge -- and hence the report showing a frost line 12 feet deep.

Well, after the weather men got in their reports -- and they got more than 1300 covering every state -- they made up two maps, or charts, of the entire United States.

One map shows the average depth of frost penetration for every part of the country over a long period of years.

But is information about the <u>average</u> depth of penetration enough? How about those unusual winters when the mercury shoots down to record low temperatures and freezes things up solid? For instance, if you look at the average depth of frost penetration for Jacksonville, you find it's less than an inch. Jacksonville's winters are ordinarily very mild. Only twice in the past 100 years has the temperature been as much as 20 degrees below the freezing point -- once during President Jackson's administration and again in February, 1899. But who knows when Jacksonville may get another one of those record cold snaps. Water systems must be laid, and buildings put up, to meet not only average winter conditions, but also conditions when the frost goes two or three times as far into the ground as usual.

So, the weather men made up a second map. The second map shows the deepest frost penetration on record for various parts of the country.

At New Orleans you find the deepest the ground has ever frozen is about two inches. As you move up the Mississippi Valley, you find the record, or maximum, frost line going deeper and deeper. At Vicksburg, the record is 10 inches---St. Louis, 30 inches---and around St. Paul and Minneapolis, 108 inches, or exactly 9 feet.

Generally speaking, you find the maximum frost penetration for a particular locality is just about twice the average frost penetration. In most of the country, if you find the frost goes into the ground on the average of about 5 inches, you can expect it to go about 10 inches in one of those bitter cold winters we have every so often. So, in most parts of the country--especially in the colder sections---you run your foundation, or lay your pipes, about twice as deep as the ground freezes, on an average.

But that little formula doesn't hold good for all sections. In the warm fringe across the southern part of the country and up the Pacific Coast, you may have winter after winter with little or no freezing at all. Then comes the record cold snap. Although the ground may freeze down only an inch, or even less, that inch may be six or eight times the average depth. So, to know what to expect in the way of frost penetration, in those unusual years, you really have to have the records of maximum frost penetration covering a long period of years.

Now, here's an interesting thing about those two maps.

As you would naturally expect, the frost goes deeper and deeper into the ground in a rather gradual fashion as you move from the Gulf Coast up toward the Canadian Border. It also goes deeper and deeper at a fairly steady rate as you move from the warm Pacific Coast eastward into the mountains and Northern Great Plains region.

Well, that increase in frost penetration as you move toward the country's refrigerator around Minnesota, the Dakotas, and Montana is not only fairly steady but also an increase you can predict by a kind of rule. The rule is very simple. Here it is:

The frost line drops about one inch for every 25 miles you travel from the Gulf northward and from the Pacific Coast toward northern Minnesota.

In other words, if you started at the Gulf Coast during a severe cold snap and walked northward, this is about what you'd find: After you once struck frozen ground, you'd likely find the soil frozen one inch deeper for every 25 miles you moved toward the Canadian border. If you happened to be traveling in one of those record cold winters I was telling you about a moment ago, by the time you got to St. Paul, you might have to go down 9 feet before you struck soft earth.

That drop in the frost line as you go northward from the Gulf or eastward from the Pacific is at about the same rate as the drop temperature. The average winter temperature drops about one degree for every 25 miles you move northward from the Gulf or eastward from the Pacific toward Minnesota.

But that doesn't mean you'll find the ground frozen to the same depth at two different places just because the temperatures happen to be the same.

For example, a week of zero weather at Hastings, Kansas, is apt to send the frost much deeper into the ground than a week of zero weather at Columbus, Ohio, or some other Eastern city. Why?

Well, the depth to which the ground freezes depends, among other things, on the amount of snow on the ground. The snow keeps the ground warm and keeps the frost from going as deep as it otherwise would. Since the North-Central and North-Eastern sections are apt to have much more snow than the dry, wind-swept Plains, the frost usually doesn't get as deep into the ground in the North and East as it does in the Plains country.

But the difference in the amount of snow isn't the only reason for the difference in the frost line at two places with the same temperature.

Trees, and leaves, and grass also help keep the frost out of the ground. And, of course, the eastern part of the country has a much heavier covering of trees, and grass, and other vegetation than the Grean Plains. So, that's another reason why a week of zero weather in the neighborhood of Hastings, Kansas, might send the frost much deeper into the ground than a week of the same weather in the neighborhood of Columbus.

Then, of course, the depth of the frost line depends a great deal on the kind of soil. A sandy soil is open and porous; cold can sink into the sandy soil very quickly. But a loam or clay soil is tight and tends to keep out the cold. That explains why you sometimes find considerable difference in the frost line in adjoining fields or lots; the two fields or lots simply have different kinds of soil.

But, the important thing to remember out of all of this is that the weather men now have accurate charts and records showing the average and maximum depth of the frost line for all parts of the country. You no longer have to guess about the depth of frost penetration in a particular community.

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ANNOUNCEMENT: And that concludes today's Chat With the Weather Man, brought to you through the cooperation of Station_____with the United States Weather Bureau.

UNITED STATES DEPARTMENT OF AGRICULTURE

Radio Service

OFFICE OF INFORMATION

CHATS WITH THE WEATHER MAN

Friday, March 17, 1933.

(FOR BROADCAST USE ONLY)

Speaking Time: 10 Minutes.

OPENING ANNOUNCEMENT: And now a snappy, sparkling greeting from the Weather Man. For, today, the Weather Man chats with you about frost. He brings you his Weather Chats at this time every two weeks through the cooperation of the United States Weather Bureau.

--ooOoo--

Along about this time of year, folks in many parts of the country are keeping their eyes peeled for signs of frost.

Orchardists have fruit to protect and gardeners their truck crops.

So, today, we're going into a few simple points on when and where you can expect frosts and how the fruit or vegetable grower can protect his crops from frost damage.

Of course, as farmers learned long ago, frost protection begins with the location of your garden or orchard. You try to pick a place for your trees or vegetable crops where they will have good air drainage. If you put your orchard or garden in a low place or depression with no place for cold air to drain out, the heavy, cold air will flow down into the low place and stand there all night long like water in an undrained swamp. Crops or trees in those cold-air swamps may freeze on a night when crops or trees in a more favorable location escape unharmed. So, if you put out any truck crops or trees, pick a place where the cold air will drain away from your crops and trees.

But, of course, unless you protect your crops and trees in some way, they may freeze no matter how well the cold air drains away. So, let's take up a few simple ways to judge the danger of a freeze on a particular night and to tell whether your fruit or vegetables need protection.

First, we find you often can judge the danger of frost pretty well by the amount of moisture in the air.

When the air is close and damp, we're much less likely to have a bad frost than when the air is dry. Floyd D. Young, frost specialist in the Weather Bureau, explains why. When the air is full of moisture, the moisture acts about like a hover over a brood of chicks. It absorbs heat waves as they rise from the warm earth and reradiates right back down to the ground.

Then, the moisture in the air helps keep the air warm in still another way.

The invisible particles or molecules of moisture in the air are capable of furnishing a lot of heat. That may sound strange. But let's consider how that moisture got up in the air in the first place and what keeps it up there.

Suppose we have a kettle of cold water sitting on the stove. We light a fire under the kettle. The water gets warmer and warmer until it reaches the boiling point. After the water begins to boil, the temperature stays the same no matter how high you turn the fire. Why doesn't it keep on getting hotter? Well, after the water starts to boil, all the extra heat you put under the kettle goes to make steam -- wholly invisible gaseous water, not the fog you see beyond the spout, that is condensed steam. When this invisible water vapor, whether it comes from a kettle on a stove, or from the surface of a river or lake, is cooled it collapses, so to speak, and comes down as dew, or frost, or in some other way, especially as fog and cloud.

What happens to the heat when this condensation occurs? Does it vanish in some mysterious way?

No, as dew or frost begins to "fall" after sundown or fog or cloud forms, the heat escapes into the air. That heat does not warm the air to a higher temperature but keeps it from cooling as much as it otherwise would after the sun goes down. So, naturally, a lot of moisture in the air means a lot of heat will escape when the dew begins to "fall." A lot of moisture means less danger of frost.

Young has worked that idea into a simple rule. He says, "If the dew begins to 'fall' while the temperature is still as high as 45 degrees, you know the air is pretty well soaked with moisture. You also know the temperature will drop rather slowly during the rest of the night."

And then Young goes ahead to tell us the likelihood of frost depends not only on how much moisture is in the air overhead but also the amount of moisture underfoot. If the ground is wet from a heavy rain, the temperature may drop fairly steadily after sundown until it comes to that of the surface. Then, as the air cools further, the stored-up heat in the water escapes to it and helps check the fall in temperature.

So, there you have two pretty good guides as to the danger of a heavy frost during the night: We're not likely to get a heavy frost if the air is full of moisture or if the ground is wet.

Those two points tie in closely with a third point.

You've all heard the old saying, "Three days rain and then a frost." Well, Young tells us that old saying has some truth in it. For, as you know, our weather comes in bunches. We get a few days of rain and then a few days of clear weather. So, after three days of rain, we often get a night with a clear sky and very little wind -- the very kind of weather when you can expect a frost.

But, as a matter of fact, we're more likely to get a heavy frost the second night after a rain than the first night.

On the first night, the ground is still pretty wet. A lot of moisture is evaporating into the air. This evaporation lowers the temperature. However, when dew starts to fall, and again after the air has cooled to the temperature of the surface, the moisture in the air and the water in the ground let loose a lot of heat to the air. That heat tends to ward off a heavy frost.

But, by the second night, the ground has dried out somewhat, and the air is drier, and the wind has died down. So, we're likely to get our worst frost the second night after a rain.

By the time the third night rolls around, the weather usually has warmed up quite a bit. The temperature may be too high for frost. But you can't always depend on that. If the weather happens to be clear and cool over a wide stretch of country, and if weather conditions are rather settled, we may get a bad frost not only on the third night after a rain, but even as late as the fourth night.

So, there is another general rule about when to expect frost: We sometimes get a bad frost the first night after a stretch of rainy weather. But we're even more apt to get a bad frost the second night.

Then, of course, we can tell something about the danger of frost by the wind and the clouds.

As everybody knows, we usually don't get frost as long as a moderate wind is blowing. The reason is simple. The wind mixes the warmer upper air with the layer of cold air near the ground and so keeps the air near the ground above the freezing point.

We are also fairly safe from a heavy frost as long as heavy, low clouds cover the sky; that is, unless those clouds happen to pass away during the night. Here, again, the explanation is easy. Those clouds absorb the heat waves as they rise from below and reradiate heat back down to the ground.

But, remember, I'm speaking only of clouds that hang heavy and low. If the clouds are thin, and white, and fleecy-looking -- and if the clouds ride high up in the sky -- we may get a bad frost even when the sky is entirely covered. For those white, fleecy clouds -- the kind the weather men call cirrus clouds -- are little particles of ice floating around probably 20 or 30 thousand feet from the ground. Naturally, being 40 degrees to 50 degrees below zero, they don't send much heat to the earth. Neither do they help much in keeping away a frost.

So, we can say, a moderate wind or heavy, low-hanging clouds may prevent a frost. But those white, fleecy clouds riding high in the air have very little effect on the temperature.

And now let's run over the frost pointers Young has given us in one, two, three form:

First, put your orchard or garden in a place where it will have good air drainage.

Second, we're much less likely to have a bad frost on a night when the air is full of moisture than when the air is dry. If the dew begins to "fall" while the temperature is still above 45 degrees, you can look for a rather slow drop in temperature during the rest of the night.

Third, the saying, "Three days rain and then a frost," has considerable truth in it. However, we're more likely to get a heavy frost the second night after a rain than the first night.

Fourth, we're not apt to get frost when a moderate wind is blowing.

Fifth, heavy, low-hanging clouds usually keep away frost.

But, sixth, thin, white, fleecy-looking clouds have very little effect in keeping up the temperature.

--ooOoo--

CLOSING ANNOUNCEMENT: And that concludes another Chat With The Weather Man, brought to you by Station _____ through the cooperation of the United States Weather Bureau. We'll have another Weather Chat for you at this same time two weeks from today.

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UNITED STATES DEPARTMENT OF AGRICULTURE

Radio Service

OFFICE OF INFORMATION

CHATS WITH THE WEATHER MAN

Friday, March 31, 1933.

(FOR BROADCAST USE ONLY)

Speaking Time: 10 Minutes.

ANNOUNCEMENT: And here's the Weather Man -- this time with a story about Uncle Sam's flood warning service. He brings you this story as one of his regular chats with the weather man from the United States Weather Bureau.

--ooOoo--

Sunday morning a week ago, a Cincinnati manufacturer visiting in Washington, D. C., read about the big flood down along the Ohio River.

The manufacturer 'phoned the River and Flood Division of the United States Weather Bureau and inquired, "How high will the Ohio River go at Cincinnati?"

M. W. Hayes, chief of the division, answered, "We expect the Ohio to reach a crest of 63 to 64 feet at Cincinnati Wednesday morning."

When Hayes said 63 to 64 feet, that manufacturer knew instantly just how high the flood waters would get in his manufacturing plant along the Cincinnati water front. He immediately called his men by long distance from Washington and gave them instructions about moving certain perishable material in his plant out of reach of the water.

About that same time, other folks throughout the country were also besieging the river and flood men in Washington for information about the flood. Some were interested for business reasons; others had friends or relatives in the flood zone.

But, of course, the big interest centered in towns along the Ohio Valley.

Just after that big two-inch rain fell over the Ohio River basin on March 13 and 14, the district centers of the River and Flood Division began to broadcast, and telegraph, and bulletin their flood warnings.

For instance, on March 14, the Cincinnati district center forecast a flood stage of 52 feet for March 18. Along came another big rain on the 19th and 20th and the flood men raised their estimate of the flood crest from 52 feet to 63 or 64 feet. The river reached its high stage of about 63 and a half feet on Wednesday the 22nd just as the flood men predicted.

At the same time, other district centers up and down the river -- centers at Pittsburgh, Parkersburg, and Cincinnati -- and Louisville, Evansville, and Cairo -- were making similar forecasts.

So, you see, the flood caught nobody napping. Folks knew well in advance just about how high the water would get at such and such a time. They had plenty of chance to move or protect their property in any way they could. Of course, the flood waters did an immense amount of damage and took several lives. But those losses weren't due to a lack of advance warning. Folks got the warnings but lost their lives or property for other reasons.

Hayes tells me those district centers base their forecasts, or warnings, on rainfall records and river measurements.

Each of those district centers in the Ohio Valley, along with the rest of the 64 centers on our main rivers throughout the country, is a pretty well defined part of a river system. The district center has rainfall gauges scattered around over its particular section of the river basin. It also has gauges to measure the height of the water along the main rivers and their principal tributaries. Every morning at 7 o'clock, each district center gets reports on the rainfall and river stages, especially from points upstream, and with those reports, the men at the district centers can sit down and figure out how much the river will rise or fall during the next few hours, or days, or weeks.

Along the upper stretches of the Ohio -- and the same thing is more or less true of the other rivers -- the flood men make their forecasts for only one to four days in advance. The period between a rain and the time when that rain water rolls into the river and raises the river level is very short. But as you move downstream, the flood and river men forecast the river stages for longer and longer periods ahead. At the mouth of the Mississippi, they make accurate forecasts as far ahead as three or four weeks. They can make those long-time forecasts because they know how fast the river is rising upstream and how long it takes for flood waters to work their way down to, say, New Orleans.

As long as the river is running along at something near its normal rate, most folks pay very little attention to those forecasts. The reports interest only boat captains who want to know how deep the water is over certain sand bars or shoals, or men who are doing construction work along the rivers.

But just let the river start on a rampage like the Ohio did a couple of weeks ago --- Folks along the river bottoms begin to follow those river-stage figures over the radio, and in the newspapers, and other places about like they do baseball or football scores. A forecast of, say, "52 feet by tomorrow night" may mean they'll have the river right at their door, or in the parlor, or in the barn. They've learned to know just what those figures mean.

Just to illustrate, Hayes tells of two negro farmers who came to his office at Cairo, Illinois, during a July flood a good many years ago to ask how high the river would likely go. Hayes told them the forecast was for 45 feet. One negro looked at the other and asked, "How much of your farm will the river cover?" The second negro replied the water would get all but so many feet of his corn. And the second negro in turn asked the first, "How much of YOUR place will the water get?" The first negro replied the water would get up to a certain point on a certain cottonwood tree on his farm.

Those two negro farmers knew exactly how much of their farms would be covered by the river at a stage of 45 feet. They, like other folks along the river bottoms, had driven stakes in the ground or notched trees to mark the high water marks in previous floods.

When folks get forecasts of high river stages, they begin to make things ship shape for the flood waters.

One man keeps several thousand hogs on an island in the Mississippi. If the river is going to cover the island, he must have advance warning so he can move the hogs to the mainland.

Another man has a herd of cattle on an island in the Potomac near Washington. He, too, must move his animals during big floods.

Hundreds of farmers pasture herds of cattle in lowlands along the rivers. Those cattle tend to hunt the high places in the pasture. When the flood water rises, it gradually closes in on all sides of the cattle and leaves them marooned. So farmers move their cattle back to higher land when they expect the river to overflow its banks.

Packet boats, discharging cargoes at country landings, watch the river stage forecasts to see how high up on the bank they will have to put the stuff they unload.

The Red Cross keeps in close touch with the river stage forecasts in planning its relief work. If it gets warning of a bad flood in a certain district, it marshals its forces and supplies to move at a moment's notice.

River forecast records also play an important part in many court cases. Let's say a man is suing an insurance company to collect damages on property carried away or destroyed by flood waters. If the insurance company can show the man got a flood warning in plenty of time to move or protect his property, the insurance company is apt to win the suit.

As a general thing, folks take the flood warnings at their face value. If the forecast says a 45-foot stage, they prepare for a 45-foot stage.

But a few years ago, a district along a river flowing into the Mississippi got a warning that sounded unbelievable. The forecast predicted a rise of about 30 feet within a period of 12 or 18 hours. The forecasters realized their prediction was very unusual and broke their customary practice of giving no advice with their forecast. They cautioned farmers to get their livestock up to high ground. But nobody had ever heard of such a thing as a rise of 30 feet in a half day's time. So many folks failed to heed the warning. But the flood came as forecast. Several persons lost their lives in a last-minute effort to save their stock and property. Today, folks in that district act on the forecasts without question.

Hayes tells me the river and flood men have been putting out their river stage reports for around 60 years.

Years ago, before the day of radio, farmers in the lowland sections used to gather at a country store during times when the river was rising and put in a 'phone call to the nearest Weather Bureau station. The farmer doing the talking would ask the weather man about the river stage forecast. As the weather man gave him the details of the forecast, the farmer would repeat them for the benefit of the rest of the farmers. The other farmers would ask questions and make notes. Different men might ask the same question in a little different way a half dozen times. Sometimes, they kept the line open 15 or 20 minutes.

But after radio stations began to broadcast river stage reports, farmers in the lowlands bought radios. Today, they get hour to hour reports on the river stage while they sit at home in their parlors.

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CLOSING ANNOUNCEMENT: And that concludes the Weather Man's story about Uncle Sam's river and flood service. He will be around again with another Chat from the United States Weather Bureau at this same time two weeks from today.

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UNITED STATES DEPARTMENT OF AGRICULTURE

Radio Service

OFFICE OF INFORMATION

CHATS WITH THE WEATHER MAN

Friday, April 14, 1933

(FOR BROADCAST USE ONLY)

Reading time: 10 minutes.

ANNOUNCEMENT: And here's the Weather Man with more new and interesting facts about the weather. In today's Chat, he tells us about the new teletype weather maps -- the latest wrinkle for putting up-to-the-minute information about flying weather along the airways in the hands of our mail and passenger pilots. He brings you this Chat from the United States Weather Bureau.

---ooOoo---

Today, we're aboard one of the big transport planes zipping our way through the clouds from New York to Chicago.

When we left New York, the air was still -- and the sun shining -- and the sky fairly clear. But, as we speed westward, we seem to be running into bad weather. The clouds are lowering and thickening -- and the sun is out of sight -- and we're battling a strong head wind. We bump out of one air pocket right into another. Our plane tilts from side to side as some invisible monster tugs and jerks at the wings.

Ahead in the cockpit, our pilot sits with radio headphones clamped over his ears, studying a weather map.

Apparently, the map and the radio give warning of still worse weather on toward Chicago. The pilot is throttling down his motor and we're slowly losing altitude. He has decided he won't try to make the next regular airport; he is dropping down to an emergency landing field just ahead to wait until the storm blows over. He can't take too many chances.

We're now only a hundred feet above the ground -- and now the wheels are touching the field -- and now we're bumping along to a stop.

While we're waiting for the storm to pass over, let's find out a little something about those mysterious radio messages and weather map that warn our pilot of dangerous flying weather along his course.

Our pilot got his radio report on flying conditions on toward Chicago from one of the network of radio stations operated by the airways division of the Department of Commerce. He gets those reports every hour.

The pilot also has one of the special weather forecasts for aviation sent out every four hours from the 14 district aviation forecast centers.

He also keeps in touch by radio with the airline's plane dispatchers to get directions on whether to land or go ahead.

Then, you remember, we saw our pilot studying a weather map.

We look at the pilot's map and find it covers the eastern part of the country extending not quite to the Mississippi river. The map is a regular jumble of figures, and arrows, and symbols of this and that kind. To us, it looks much like a Chinese puzzle. But, to the pilot or the airway official, that map gives a complete and clear picture of flying weather throughout the entire eastern United States. He sees lines, called isobars, passing through places having the same barometric pressure; he looks at the figures, and arrows, and symbols at Buffalo, New York, and reads, "Ceiling, unlimited -- sky, scattered clouds -- visibility, only 5 miles because of smoke -- temperature, 42 degrees -- dew point reading six degrees below the temperature -- wind, blowing from south at 11 miles an hour." The pilot or official sees the same kind of weather information at other towns and cities throughout the East.

But just how recent is that information? Is that map a day or so old?

No sir! The airmen get those maps while the weather facts are still sizzling hot. You may think I'm exaggerating a bit. But just listen to W. R. Greggs account of the way those maps are prepared and distributed. Gregg is in charge of the aerological division of the Weather Bureau. The men in the Weather Bureau gather their facts about the weather and make those maps up in manuscript form. They turn those maps over to the airways division of the Department of Commerce to get out to the airlines. Those maps go out from Cleveland for the East -- and from Kansas City for the Mid-West -- and from Oakland for the West, every four hours.

Gregg tells me the weather men gather facts about weather conditions, and make the manuscript maps, and through the Commerce division teletype system get printed maps in the hands of pilots and officials along the airways -- all in less than an hour's time. All in less than an hour, mind you.

Just to illustrate the speed with which the weather maps are made and distributed, let's trace through the story of the map we saw in the hands of the pilot on our plane from New York to Chicago.

Weather observers throughout the entire East took records on the condition of the sky, and the visibility, and temperature, and wind direction, and so on, and flashed those records to Cleveland by radio, teletype, and telegraph. The weather men in Cleveland wrote those records in on a map. Within 14 minutes after the weather men had finished their map, copies of that map were in the hands of the men on our big airways throughout the East. When our New York-to-Chicagopilot picked up that map at our last regular stop, he had a picture less than an hour old of weather conditions from the tip of Florida to Maine, and from the Atlantic inland almost to the Mississippi.

But how can we send a map from Cleveland to, say, Atlanta, Georgia, some three or four hundred miles away -- all in less than a quarter of an hour?

That is done by the teletype system -- the same system our big press associations now use in sending news from their district news centers to newspapers throughout the country.

The operator in the district offices of the press associations sits down before a machine something on the order of a typewriter. His machine is connected by telegraph wire with other machines -- other machines also much like big typewriters -- in newspaper offices in dozens of other towns and cities. When the operator in the district office hits the letter "A" on his machine, every machine on that circuit strikes the letter "A." If the district operator writes, "Train wreck kills 100 persons," every teletype machine on that circuit writes the same thing. By the time the district operator finishes "typing out" his story, every newspaper on the circuit has exactly the same story in typewritten form.

The men who send out the aviation weather maps follow exactly the same system -- only they send maps instead of news -- and their machines are a little different from the teletype machines in newspaper offices.

The operator at Cleveland, or Kansas City, or Oakland, sits down at his teletype machine with a copy of the map the weather men prepared for him. His machine is connected by telegraph wire with other teletype machines along the main airways. Both the district operator's machine and the teletype machines out along the airways have blank maps stuck in them much the same as you stick a sheet of writing paper in a typewriter. The maps show the outlines of the states and some of our main towns and cities. The district operator now begins to type in on that map the picture of weather conditions.

But how can you type a map?

Well, you remember, I told you those weather maps are covered with queer-looking jumbles of letters, and figures, and dashes, and circles, and arrows. Each of those letters, and figures, and circles, and so on stands for a certain thing -- the condition of the sky, and temperature, and visibility, and other facts of interest to aviators. Those various figures and symbols appear on the keyboard of the teletype machine instead of the letters and figures you find on an ordinary typewriter. So, when the district operator wants to show a rain, or fog, or clouds at St. Louis, he types in a certain combination of letters, figures, and symbols on the map in his machine to show that particular weather condition. While he is typing on his machine in the district office, all the rest of the teletype machines on the circuit are typing exactly the same thing and at exactly the same place on the map.

The district operator at Cleveland, or Kansas City, or Oakland, may type in right opposite Chicago on his map, "U -- a plain circle -- 10 -- 42 -- minus 6 -- an arrow pointing north -- 11." In plain English, that means, "At Chicago, the ceiling is unlimited -- the sky clear -- visibility 10 miles -- temperature 42 -- dew point reading, 6 degrees less than the temperature -- and wind blowing from south at rate of 11 miles an hour." He types the same kind of information beside other key towns and cities on his map.

By the time the district operator finishes typing in weather information on the map in his machine, every airport on his circuit has a map giving exactly the same information. The men at the airports use these maps in dispatching planes and give copies of the maps to their pilots.

Before the days of the teletype, the airmen got weather maps only every 12 hours. Twelve hours is a mighty long stretch when it comes to flying weather. The weather can change a great deal in that time. At 8 o'clock this morning, the weather might be as fair as could be. By 8 o'clock this evening, we might be having a violent storm. But the air men no longer have to wait 12 hours for their maps. Thanks to teletype, they get new maps every four hours.

Gregg tells me the teletype system now covers 13,000 miles of airways and serves 74 stations.

--ooOoo--

ANNOUNCEMENT: And that's the story of the teletype system for sending aviation weather maps to pilots and officials along our important airways. The Weather Man brings you another Chat from the United States Weather Bureau at this same time two weeks from today.

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UNITED STATES DEPARTMENT OF AGRICULTURE

Radio Service

CHATS WITH THE WEATHER MAN

Friday, April 28, 1933.

FOR BROADCAST USE ONLY

ANNOUNCEMENT: And now for our chat with the weather man. We read the weather forecast every day. We see and hear the same terms used over and over again. But do we have a clear idea of just what those terms mean? Well?--

--o--

The old song says it is always fair weather when good-fellows get together.

But, of course, the weather man doesn't make his forecasts in any such convivial spirit.

The dictionary defines "fair" as clear and cloudless. On the other hand, some folks regard the weather as "fair" so long as it doesn't rain. They speak of the day being "fair" when the sky is completely overcast with clouds.

Neither of those is exactly the meaning of the word "fair" when it appears in the official government forecast you most often read in the upper corner of your newspaper or hear quoted over the radio.

When the U. S. Weather Bureau's forecast says "fair" it means that no precipitation; that is, no rain, or snow, or sleet, is expected; but the character of the sky may range from clear to partly cloudy.

When no precipitation is expected, and the sky is expected to be free or nearly free from clouds, the forecaster uses the word "clear." When no precipitation is in prospect, but the sky is expected to be overcast with clouds, the forecaster says so. He uses the simple, straight-forward word "cloudy" to define the expected condition.

If he judges that the sky will be overcast, but that there will be occasional breaks which will last considerable time, he uses the words "mostly cloudy."

And when the indications are that there will be no precipitation, but some cloudiness, he phrases his prediction with the term "partly cloudy."

So you see each term in that weather forecast has a very definite meaning all its own. The forecasts have to be short and to the point, and so the same definite word is used regularly to describe the same sort of expected conditions. Of course, there is not much chance for us to go wrong in interpreting such forecast words as "warmer" or "colder" or "local thunderstorms" or "fog" or "cold wave" or "light frost" or "heavy frost". They speak a language we all understand.

But E. B. Calvert, chief of the forecast division of the United States Weather Bureau, tells me that the Weather Bureau often gets inquiries as to the exact meaning of some of these other terms we have been talking about.

We have mentioned "fair" and "clear" and "cloudy" and "mostly cloudy" and "partly cloudy". Then there is the expression "generally fair". The forecaster uses the term "generally fair" usually when he is referring to relatively large areas, such as a whole State, or half a State. When he predicts "generally fair" Calvert points out, the forecaster has in mind that there will be some variation in cloudiness and possibly some light precipitation in scattered places, but over most of the area the sky will be clear to partly cloudy.

When he predicts "increasing cloudiness" he expects the sky will be clear or partly cloudy at the beginning of the forecast period, becoming overcast by its close; or, the sky will be nearly overcast with thin, high clouds at the beginning of the period and intermediate or low clouds will develop before its close.

Of course, you know our weather forecasts are for definite periods. Those issued in the morning from all the district forecast centers are for 24 hours, divided into two periods of 12 hours each. The first period begins at 8 p.m. Eastern Standard Time, of the day of issue, and the second begins at 8 a.m. and runs to 8 the next night. When the weather man says "tonight" he means from 8 p.m. until 8 o'clock in the morning. And when he says Friday, he refers to the period from 8 in the morning Friday to 8 at night. In local forecasts, you may notice forecasts issued on week-day mornings for "this afternoon." But the weather man's afternoon extends from noon to 8 at night.

The forecasts issued in the evening are for 36 hours, beginning at or just before 8 o'clock the next morning. They are not for as closely-defined periods as those issued in the morning. They refer principally to daytime conditions, except in cases where "night" is specifically mentioned.

But to get back to the weather words; "unsettled" doesn't refer to the state of mind of the forecaster. When he says "unsettled" he has a pretty clear idea that there will be considerable cloudiness and threatening weather, with very little, less than two hundredths of an inch of snow, or rain, or none at all.

But maybe we should explain what "threatening" weather is. It certainly isn't clear. To the weather forecaster, "threatening" refers to a sky overcast with dark, lowering clouds, but under such conditions that he does not think it likely that there will be rain or snow, or other precipitation.

The weather men prefer to use that word "precipitation" because it takes in any and all forms of rain, snow, sleet, and the like. When he says "rain" he means rain that lasts a comparatively long time, not just showers or occasional rain.

Intermittent rainfall of comparatively short duration he refers to as "showers" and rainfall at infrequent intervals but not prolonged he refers to as "occasional rain".

So it is with snow. When the forecaster says "snow" he means snowfall that will keep up for some time, not just occasional snow, or snow flurries. If he thinks the prospects are for snowfall at infrequent intervals and not prolonged, he words his forecast "occasional snow" and if he finds the indications are for very light and intermittent snowfall, the term he uses is "snow flurries."

Another thing folks often get mixed up on Calvert says is "sleet" and "glaze". Sleet is precipitation in the form of small ice pellets produced by the freezing of rain in the free air. Those pellets are dry, you know, and do not cling to anything in falling. "Glaze," on the other hand, is that ice coating formed from rain freezing on objects in a very shallow layer of cold air, the temperature of both the air and the objects being below the freezing point. A deposit of glaze on an extensive scale is called an "ice storm," but that term is not used in forecasts.

"Probably," and "probable," and "possibly" are words you sometimes see or hear in the forecasts of precipitation, but they are not such weasel words as some folks seem to think. "Probably" or "probable" signifies that, in the judgment of the forecaster, precipitation is very likely to occur. "Possibly" indicates uncertainty, but that precipitation is more likely to occur than not.

Another term that sometimes raises questions is the term "Clearing." That term is used by the forecaster when precipitation which will take place in one 12-hour period is expected to end shortly after the beginning of the next forecast period, and to be followed soon thereafter by broken clouds or clear sky.

Speaking of clearing, however, I hope that this helps clear up some of the doubt in some folks minds about the terms used in the daily weather forecast. Anyway, look at the forecast in your papers, or listen for the exact wording as given over the radio with this idea of the definite meaning of the terms in your mind. It may make the forecasts more meaningful for you.

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ANNOUNCEMENT: You have just heard a chat with the weather man on weather forecasts and their meaning, as explained by E. B. Calvert, chief of the forecast division, of the United States Weather Bureau. We will have another of these chats with the weather man two weeks from today.

UNITED STATES
DEPARTMENT
OF AGRICULTURE

Radio Service

OFFICE OF
INFORMATION

May 3, 1933.

Program Director:

On account of the necessity for getting out emergency information on the Federal Government's operations under the pending act to restore farm purchasing power, we are forced to discontinue for the time being the radio series entitled, "Chats with the Weather Man" which you so kindly have been broadcasting for the U. S. Department of Agriculture.

With many thanks for your past cooperation and hopes that you will resume broadcasting when we are again able to resume the series, I am

Sincerely yours,

Morse Salisbury
Chief of Radio Service.